Amendments to the Specification:

In the Abstract:

Please replace the Abstract of the Disclosure at page 10 with the following rewritten Abstract. A clean copy of the Abstract is attached hereto as a separate document.

-- A method for isotope separation of thallium using a laser beam ~~is disclosed. The method comprises~~ comprising the steps of: (a) producing photons of a first frequency by a laser system, wherein ~~said first~~ a wave length of the first frequency is about 378 nm; (b) producing photons of a second frequency by ~~said laser systems~~ the laser system, wherein ~~said second~~ a wave length of the second frequency is about 292 nm; (c) producing photons of a third frequency by ~~said laser~~ the laser system, wherein ~~said third~~ a wave length of the third frequency is in the range of 700 nm to 1400 nm; (d) applying ~~said photons~~ the photons of ~~said first~~ the first, second and third frequencies to ~~said vapor of said~~ the vapor of the thallium, wherein ~~said photons of said~~ the photons of the first frequency pump isotope-selectively a plurality of ground state thallium atoms through an excited state into a metastable state, and wherein ~~said photons of said~~ the photons of the second frequency excite a plurality of metastable state thallium atoms to an intermediate, resonant state, and wherein ~~said photons of said~~ the photons of the third frequency ionize a plurality of atoms in ~~said~~ the intermediate, resonant state through continuum states; and (e) collecting ~~said isotope~~ the isotope ions. Thallium isotope can efficiently be separated with small scale facilities. --

Please replace the paragraph beginning at page 3, line 15, with the following rewritten paragraph:

-- In accordance with the present invention, there is provided a method for separating an isotope of thallium in an atomic vapor containing a plurality of isotopes of thallium including said isotope, said method comprising the steps of:

(a) producing photons of a first frequency by a laser system, wherein a wave length of said first frequency is about 378 nm;

(b) producing photons of a second frequency by said laser system, wherein a wave length of said second frequency is about 292 nm;

(c) producing photons of a third frequency by said laser system, wherein a wave length of said third frequency is in the range of 700 nm to 1400 nm;

(d) applying said photons of said first, second and third frequencies to said vapor of said thallium, wherein said photons of said first frequency pump isotope-selectively a plurality of ground state thallium atoms through an excited state into a metastable state, and wherein said photons of said second frequency excite a plurality of ~~metastabe~~ metastable state thallium atoms to an intermediate, resonant state, and wherein said photons of said third frequency ionize a plurality of atoms in said intermediate, resonant state through continuum states; and

(e) collecting said isotope ions. --

Please replace the paragraphs beginning at page 4, line 6, through page 4, line 27, with the following rewritten paragraphs:

-- ~~Fig.1~~ Fig. 1 illustrates the conceptual diagram for thallium laser isotope separation method according to the present ~~invention;~~ invention wherein ~~(a) is~~ Fig. 1(a) is a front schematic view and ~~(b) is~~ Fig. 1(b) is a side schematic view of an apparatus for carrying out the method;

~~Fig.2~~ Fig. 2 shows a partial energy level diagram of thallium atoms;

~~Fig.3~~ Fig. 3 shows isotope shifts and hyperfine structures of thallium isotopes;

~~Fig.4~~ Fig. 4 shows the experimentally measured optical pumping spectrum of thallium isotopes by using a CW laser which has Gaussian intensity distribution (full width at half maximum: 10 mm) and out put power of 20 mW;

~~Fig.5 shows is the~~ Fig. 5 shows the calculated optical pumping spectrum of thallium isotopes by using a CW laser which has Gaussian intensity distribution (full width at half maximum: 10 mm) and output power of 200 mW;

~~Fig.6~~ Fig. 6 shows the measured photoionization cross-section of 7 $^2D_{5/2}$ level of thallium atoms at the wavelength of 1064 nm of a Nd:YAG laser; and

~~Fig.7~~ Fig. 7 shows the observed mass spectra of isotope-selective photoionization of thallium ~~atoms;~~ atoms wherein:

~~(a)~~ plot (a) shows the mass spectra of non-selectively photoionized thallium atoms,

~~(b)~~ plot (b) shows the mass spectra when the frequency of optical pumping laser is resonant with ^{205}Tl isotopes, and

~~(c)~~ plot (c) shows the mass spectra when the frequency of optical pumping laser is ~~renonant~~ resonant with ^{203}Tl isotopes. --

Please replace the paragraph beginning at page 4, line 31, with the following rewritten paragraph:

-- Herein is disclosed an isotope-selective photoionization process and apparatus for thallium isotope separation from natural thallium that involves isotope-selective optical pumping followed by photoionization of thallium atoms and then electrostatic extraction of ions. This scheme takes ~~advantages~~ advantage of the large optical pumping cross-section as well as the large photoionization cross-section, and consequently only modest laser fluences are required. According to this scheme, it is possible to photoionize target isotopes selectively and efficiently by employing both isotope selective optical pumping (ISOP) of target isotopes into a metastable state and resonant photoionization (RPI) of metastable state thallium isotopes. In the latter process, metastable thallium atoms are photoionized to continuum states through a resonant excited state. Efficient ISOP of the target isotopes can be achieved with a single frequency continuous wave (CW) laser. A pulsed UV laser and a high power pulsed IR laser are used for RPI process. --

Please replace the paragraph beginning at page 5, line 22, with the following rewritten paragraph:

-- ~~Fig.1~~ Fig. 1 illustrates the conceptual diagram ~~for~~ for the thallium laser isotope separation method. Thallium atomic beam 2 is generated by heating thallium ~~at an temperative~~ at a temperature between 800-1000°C using thermal heater 1 and collimated by an atomic beam collimator 3, and then is optically and isotope-selectively pumped into a metastable state by a CW laser 4. The optically pumped thallium isotopes are photoionized by a pulsed UV laser 5 and a pulsed IR laser 6. The photoionized thallium ions 8 and electrons 9 generated during the photoionization are separated from the atomic beam by an extractor 7 biased by an external electric field. --

Please replace the paragraph beginning at page 6, line 20, with the following rewritten paragraph:

-- Hence, very efficient pumping of thallium atoms into the metastable state can be easily achieved if a CW laser frequency (about 378 nm in the wavelength) is resonant to the transition line of 6 $^2P_{1/2}$ and 6 $^2S_{1/2}$. Because the metastable state population of thallium atoms is lower than 10^{-3} when thallium is heated at ~~temperative~~ a temperature to generate an atomic beam, their initial population does not ~~affect on~~ affect the isotope selectivity at this temperature range. --

Please replace the paragraph beginning at page 6, line 33, with the following rewritten paragraph:

-- ~~Fig.4~~ Fig. 4 shows the experimentally measured optical pumping spectrum of the transition of $F_g = 1 \text{ -} \geq F_e = 1$ by using a CW laser which has Gaussian intensity distribution (full width at half maximum: 10 mm) and output power of 20 mW. ~~And Fig.5~~ Fig. 5 shows the calculated optical pumping spectrum of the same transition, assuming that a CW laser has Gaussian intensity distribution (full width at half maximum: 10 mm) and output power of 200 mW. It is clearly shown that the isotope selectivity is very high in this optical pumping process. --

Please replace the paragraph beginning at page 7, line 7, with the following rewritten paragraph:

-- While the hyperfine splitting of the ground state is about 21 GHz, that of the metastable level is about 500 MHz. Hence, effective photoionization of the metastable ~~stae atom~~ state atom is expected without interferences of hyperfine structures. Even with a relatively low power laser, metastable thallium atoms can be efficiently excited to the state $7\ ^2D_{3/2}$ (42,011.4 cm^{-1}) or to the state $7\ ^2D_{5/2}$ (42,049.0 cm^{-1}) because of their large electric dipole moments. The transition wavelength for the excitation is about 292 nm. ~~Fig.6~~ Fig. 6 shows the measured photoionization cross-section of $7\ ^2D_{5/2}$ level of thallium atoms at the wavelength of 1064 nm of a Nd:YAG laser. The photoionization cross-section of 2.7×10^{-17} cm^2 ~~is so big enough that~~ is big enough so that more than 80 % of the thallium atoms in the excited state $7\ ^2D_{5/2}$ can be ionized by a Nd:YAG laser with the pulse energy density of 40 mJ/pulse/cm^2. Since the ionization potential (IP) of thallium atoms is about 49266.7 cm^{-1}, efficient photoionization is expected if an ionizing IR laser with modest power has the wavelength in the range of 700 ~ 1400 nm, which corresponds to energy range of 49266.7 cm^{-1} ~ 55000 cm^{-1}. --

Please replace the paragraph beginning at page 7, line 21, with the following rewritten paragraph:

-- ~~Fig.7~~ Fig. 7 shows the observed Time-of-Flight (TOF) mass spectra of isotope-selective photoionization of thallium atoms according to this invention. When the CW laser frequency is scanned while pulsed laser frequencies are fixed, photoionization of each thallium isotope is possible. --